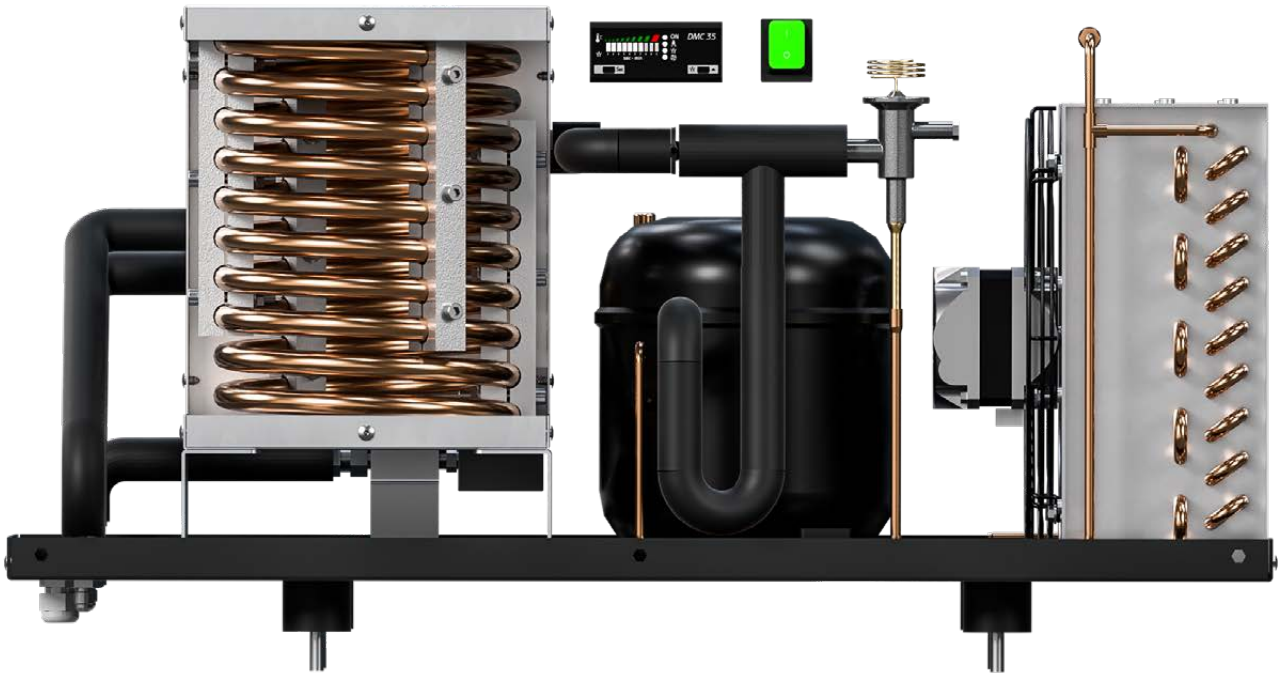
Technical Data Sheet

COLTRI COMPRESSORS

TORNADO REFRIGERATOR

Contact

COLTRI



Technical data

Air flow at nominai condition[1]	600 l/min / 36 m^3/h / 21 cfm
Pressure DewPoint at nominai condition[1]	5° C
Cooling capacity	1,09 kW
Nominal ambient temperature	25 °C
Max. ambient temperature	50 °C
Min. ambient temperature	1 °C
Nominai inlet air temperature (max)	60 °C (70° C)
Outlet air temperature at nominal condition[1]	≤ 5° C
Nominai inlet air pressure	300 barq
Max. inlet air pressure	450 barg
Refrigerant type	R134.a
Refrigerant quantity[2]	0,25 kg
Cooling air fan flow	300 m^3/h
Heat rejection	1,70 kW
Standard Power Supply[2]	1 Ph / 230 V / 50 Hz
Nominai electric consumption at 50Hz	0,46 kW / 2,8 A
Full Load Amperage FLA	3,5 A
Max. noise level a 1m	< 70 dbA
Weight	51 kg

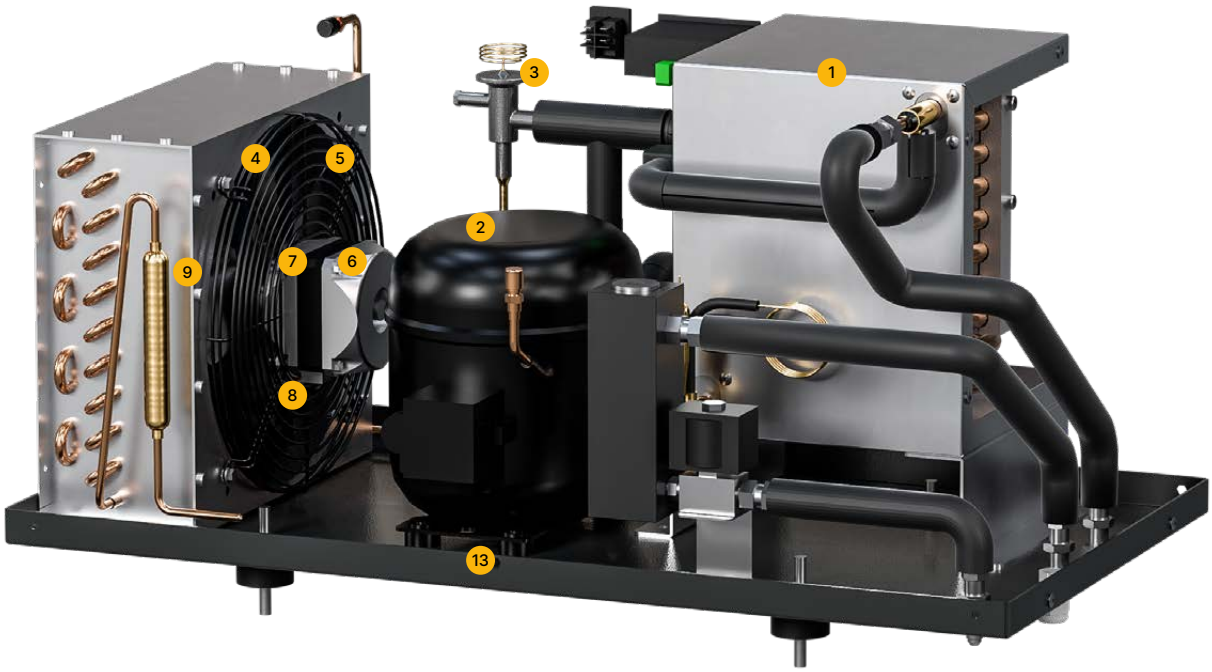
1 The nominal condition refers to an ambient temperature of +25°C with inlet air at 300 barg and 60°C.
2 Check the data shown on the identification plate.

Dimensions

Width 74 cm (29.1”)
Depth 41,1 cm (16.1”)
Height 34,8 cm (13.7”)

Weight

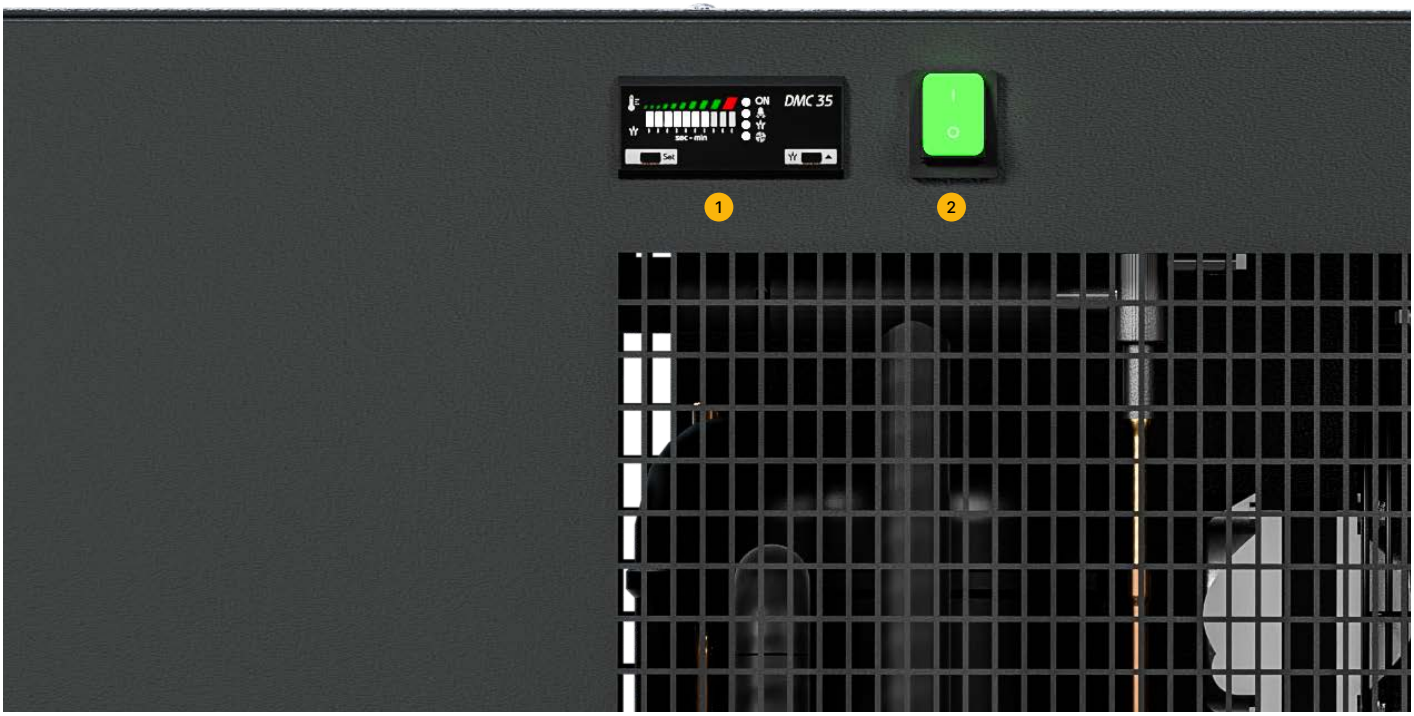
51 kg (112 lb)



Machine parts

1. Exchanger group
2. Refrigeration compressor
3. Hot gas by-pass valve
4. Condenser
5. Condenser ventilator
6. Engine
7. Fan
8. Grid
9. Filter dryer
10. Electronic instrument
11. General disconnector
12. Panel
13. Basic plate

Description of operation



1 Electronic instrument

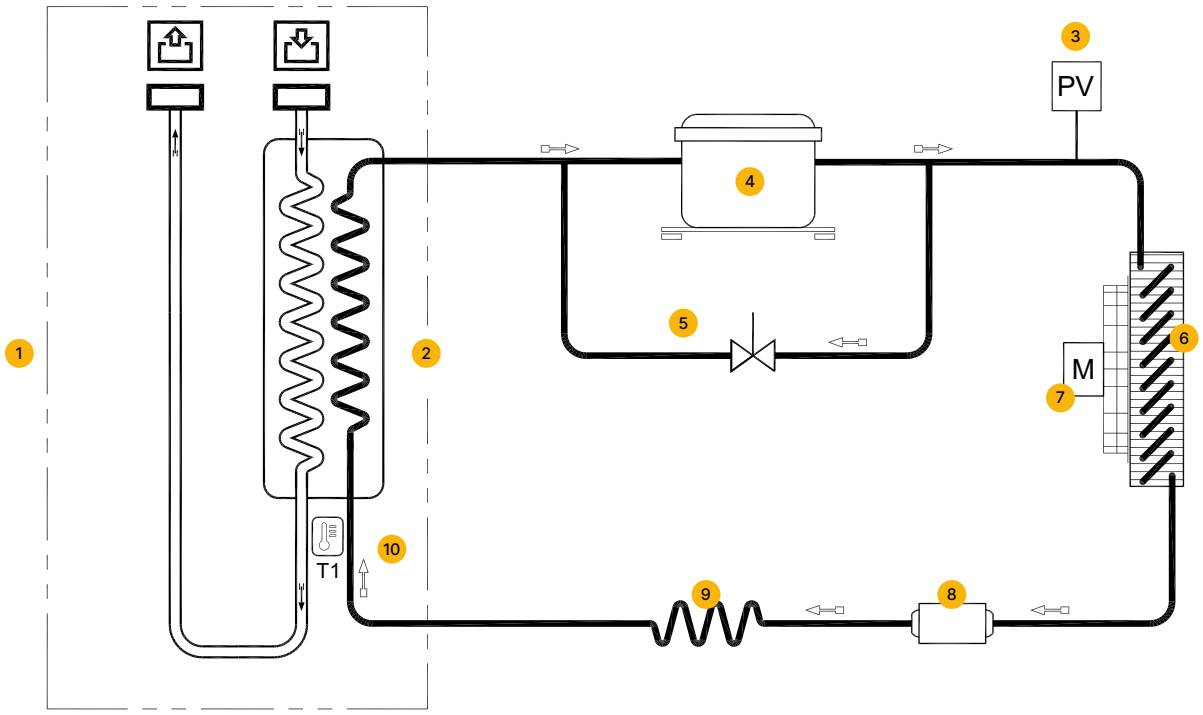
2 ON-OFF switch

Principle of operation

The incoming air, warm and humid, enters the evaporator (air-cooler exchanger) inside which the air cools, allowing the moisture it contains to condense.

Refrigerant circuit

The refrigerant gas is pumped by the compressor from which it exits at high pressure; it then enters the condenser where it is cooled and condensed, thus becoming a high-pressure liquid. The liquid is forced through the capillary tube where, by means of the pressure drop, it reaches the preset temperature. The low-pressure liquid refrigerant enters the evaporator (air-coolant exchanger): the heat of the air is absorbed by the liquid refrigerant, and this causes it to evaporate, i.e. the change of state from liquid to gaseous. of state from liquid to gaseous. The low-pressure, low-temperature gas is returned to the compressor, where it is re-compressed and the cycle starts again from the beginning. When the thermal load of the compressed air is reduced, the excess refrigerant is automatically diverted to the compressor by means of the hot gas by-pass valve.



Flow direction compressed air

Flow direction refrigerant gas

1. Exchanger group
2. Air-cooler exchanger
3. Refrigerant gas pressure switch PV (not present)
4. Refrigerant compressor
5. Hot gas by-pass valve
6. Condenser
7. Condenser fan
8. Filter dryer
9. Capillary tube
10. Temperature probe T1 - DewPoint

Refrigerant compressor

The refrigeration compressor is the system pump where the gas coming from the evaporator (low pressure side) is compressed up to the condensing pressure (high pressure side).
The compressors used, all from leading manufacturers, are designed for applications where high compression ratios and wide temperature variations are encountered. The fully hermetic construction guarantees perfect gas tightness, high energy efficiency and long life. The pumping unit, fully mounted on damping springs, drastically reduces noise emission and vibration transmission. The electric motor is cooled by the aspirated coolant gas that passes through its windings before entering the compression cylinders. The internal thermal protection safeguards the compressor from overheating and overcurrents. The protection resets automatically when the nominal temperature conditions reappear.

Condenser

The condenser is the element in the circuit in which the gas from the compressor is cooled and condensed to a liquid state. Constructively, it takes the form of a circuit of copper tubes (within which the gas circulates) immersed in an aluminium laminar pack. Cooling takes place by means of a high-efficiency axial fan that presses the air inside the dryer into the lamellar pack. It is imperative that the ambient air temperature does not exceed the nameplate values. It is equally important to keep the coil clean of dust deposits and other impurities.

Filter dryer

Any traces of moisture, slag that may be present in the refrigeration system or sludge that may be created after prolonged use of the dryer tend to restrict compressor lubrication and clog the capillaries. The filter drier serves to retain all impurities, preventing them from continuing to circulate in the system.

Capillary tube

This is a piece of copper tubing with a small diameter which, when placed between the condenser and the evaporator, creates a restriction on the passage of the refrigerant. This throttling causes a pressure drop which is a function of the temperature to be obtained in the evaporator: the lower the pressure exiting the capillary tube, the lower the evaporation temperature. The diameter as well as the length of the capillary tube are accurately sized for the performance to be achieved by the dryer; it does not require maintenance/adjustment work.

Evaporator

The air-cooler exchanger, with its countercurrent flows, guarantees excellent performance and is maintenance-free. The large size of the exchange surface determines the correct and complete evaporation of the refrigerant (avoiding liquid return to the compressor).

Hot gas by-pass valve

This valve injects part of the hot gas (taken from the compressor discharge) into the tube between the evaporator and the compressor suction, keeping the evaporation temperature/ pressure constant at approximately +2 °C. This injection prevents the formation of ice inside the evaporator at any load condition.

Aerotecnica Coltri S.p.A.

Via Colli Storici, 177
25015 Desenzano del Garda
Brescia - Italy

Tel. +39 030 9910301
+39 030 9910297

info@coltri.com

DT-TDS-TORNADO-24-V1

Printed on paper from
sustainably managed forests

Visit our showroom in Virtual Reality

coltri.com

coltri.com/showroom

COLTRI® COMPRESSORS